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ABSTRACT

The paper offers a framework for the design, implementation, and evaluation of appropriate, effective communication instructional programs for persons who are severely developmentally delayed. The use of an ecological approach that incorporates the instruction of communication skills with that of activities of daily living (ADL) is emphasized. Discussion encompasses the areas of assessment, choosing appropriate communication modes, curricula, and selected teaching strategies. A communication skills assessment should include the following: vision and hearing acuity examination, otolaryngeal examination, communication skills screening, and ecological inventory. The selection of appropriate communication modes should be based on consideration of current communication modes, motivation to communicate, physical disabilities affecting input/output modes, audience, current and future educational/vocational needs, and amount and type of professional consultation needed. The interdisciplinary team is responsible for program planning, which includes instructional objectives, specific instructions for teacher cues, specific instructions for consequating correct and incorrect responses, specific instructions for consequating behaviors which interfere with learning, and a plan for the generalization of acquired skills. Three effective training strategies are identified: (1) incidental teaching, (2) the mand-model approach, and (3) time delay. The importance of training within the context of natural settings is emphasized. (Author/DB)

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Teaching Ecologically-Based Communication Skills to Persons who are Developmentally Delayed

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Abstract

The purpose of this chapter is to supply families and other direct service providers with a framework for the design, implementation, and evaluation of appropriate, effective communication instructional programs for persons who are severely developmentally delayed. Herein, the term "communication" includes symbolic and non-symbolic means of communication expression and comprehension as well as those social skills which are appropriate to independent performance in a variety of environments. The use of an ecological approach which incorporates the instruction of communication skills with that of activities of daily living (ADL) will be emphasized. The discussion of this approach will encompass the areas of assessment, choosing appropriate communication modes, curricula, and selected teaching strategies.

Teaching Communication Skills in Community-Based Settings

Introduction

Many persons who are severely developmentally delayed are capable of living independently in community-based settings. Their success, however, will depend to some extent on their ability to independently access a variety of community environments (e.g., stores, restaurants, theaters, concerts, churches). Success in these environments is due, in large part, to the communication and social skills of such persons. It is therefore of the utmost importance that instruction in these skill areas be given high priority and that program and training issues be addressed in functional, environment-specific ways. Using an ecological approach can help meet these objectives.

Ecologically-based instruction (Brown, Branston, Baumgart, Vincent, Falvey, & Schroeder, 1979) is a relatively new training concept. Until recently, special educators relied heavily on developmental models (Brickér & Dennison, 1978) and/or remedial models (Guess, Sailor, & Baer, 1977) for the design of communication curricula and instructional

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programs. The developmental approach emphasizes teaching prerequisite skills according to the sequence in which "normal" children learn language, while the remedial approach targets functional skills for initial instruction. In general, developmental and remedial skill instruction have taken place in structured classroom settings. The ecological approach, on the other hand, stresses teaching functional responses in natural environments which are accessed frequently by the student. Given the problems of persons who are severely developmentally delayed in generalizing skills acquired in structured and/or simulated environments to more natural, community-based settings, this can only be viewed as a positive change in the design of special educational assessments and program plans as well as in the choice of selected teaching strategies.

Assessment

An appropriate communication skills assessment should include the following:

1. Vision and hearing acuity examination;
2. Otolaryngeal examination;
3. Communication skills screening; and
4. Ecological inventory.

Vision and Hearing Assessment - Introduction

Vision and hearing are primary input modes for communication, thus, accurate measures of acuity are crucial to the development of an appropriate instructional plan. For the most part, vision and hearing examinations are performed by an opthalmologist or optometrist and an audiologist respectively. In general, for persons who are severely developmentally delayed, these examinations yield gross measures of vision and hearing ability. However, the specific level of acuity remains in question. Typically, the problem lies in the fact that severely developmentally delayed individuals are unable to take tests developed for a "normal" population. With the advent of behavioral technology, however, tests for this population have been developed and field-tested successfully. The use of the Parsons Visual Acuity Test (Cress, Spellman, DeBriere, Sizemore, Northam, & Johnson, 1981) and operant audiometry (Bricker & Bricker, 1970) have proven to be examples of effective alternatives to traditional tests and can yield more valid results. These tests are based on the use of sophisticated shaping and fading techniques characteristic of errorless learning procedures.

The following will provide a description of these tests. However, it is recommended that the appropriate references be consulted for a more technical description.

Vision Assessment

A traditional vision acuity examination requires that the examinee stand 20 feet away from a letter or shape chart and read the figures to the examiner. Typically, persons who are severely developmentally delayed cannot label the figures nor understand the examiner's directions. The Parsons Vision Acuity Test (PVAT) provides an alternative by teaching the examinee to discriminate three figures, targeting one figure as the test response and allowing the examinee to use a pointing or match-to-sample response to the figures displayed 13 inches from him or her. The size of the figures on the test cards simulate the 20 foot distance required by the traditional tests. In general, this examination is performed by a special educator who is familiar with the examinee. The results of the examination are then shared with an ophthalmologist so that he or she can take the most appropriate corrective action. If corrective lenses are prescribed, the PVAT can be re-administered to determine the effectiveness of the prescription. Opticokinetic nystamus tests, evoked visual potentials, electroretinography, and simple refractive measurement are other methods of evaluation of vision useful with people with severe handicaps.

Hearing Assessment

Traditional hearing acuity tests require that the examinee wear earphones and respond to tones as presented by the examiner. Many persons who are severely developmentally delayed will not tolerate the earphones and do not understand that a response must be made when each tone is presented. The use of operant audiometry can be a potential solution to these problems. This procedure involves desensitizing the examinee to wearing the earphones and conditioning an appropriate response to the tone. The desensitization process requires that the examinee wear the earphones for increasing lengths of time with positive reinforcement being contingent on such behavior. This process may take quite some time and should be initiated in residential and school or vocational settings well in advance of the test date. Teaching the individual to make the appropriate test response involves pairing a lighted button with the tone presented through the earphones. The examinee is initially reinforced for touching the button. Once this behavior is consistent, the light is then faded systematically and only responses to the tone are reinforced. Evoked auditory potentials, heart rate response audiometry, and impedence audiometry are among other methods useful for evaluation of the hearing of people with severe handicaps. Al-

though neither operant audiometry nor the PVAT can be deemed a panacea for testing persons who are severely developmentally delayed, they have both been proven to be effective with some members of this population.

Otolaryngeal Assessment

The purpose of an otolaryngeal examination is to determine the effectiveness of the oral-motor structures for the production of speech. It is recommended that an otolaryngologist (ear, nose, and throat physician) as well as a speech pathologist perform such an examination. Although the potential for speech should never be excluded, it is possible that a person may not have the capability to produce sounds due to physical impairment. Without such knowledge, educators may pursue this goal unnecessarily.

Communication Skills Screening

The purpose of a basic language/communication skills screening is to determine the current capabilities of the persons for whom a communication program will be designed. Such a screening should include (Williams & Fox, 1980):

1. Determining behaviors which interfere with learning;
2. Evaluating expression of wants and needs;
3. Observing and noting functional object use;
4. Evaluating motor and verbal imitation;
5. Recording ecologically-relevant noun/verb comprehension and expression; and
6. Evaluating instruction following.

Because some persons who are severely developmentally delayed demonstrate erratic adaptive behavior, this screening should be replicated by familiar persons in familiar settings until a consistent behavior pattern can be determined. Realistically, a valid, reliable screening may take one to six months to complete. This process, however, does not have to delay the design and implementation of a program to teach a functional communication response, for example, indicating wants and needs. When the screening is completed, the results must be collated by the examiners in preparation for sharing them with those individuals who will make communication mode and instructional program decisions. In reality, many persons who are severely developmentally delayed will need instruction in some combination of speech, sign lan-

guage, and communication board use in order to live independently in community-based settings.

The purpose of an ecological inventory (Brown et al., 1979) is to identify current and subsequent environments which are or will be accessed frequently by the student. In addition, skills which are important to independent functioning in such environments are delineated. Generally, the ecological inventory is conducted by the special educator who is responsible for generating an instructional plan for the student. This plan is known as the IEP (Individualized Educational Plan) in public school special education, the IPP, ISP, or IHP (Individualized Program, Service or Habilitation Plan) in mental health, or the IWRP (Individualized Work Rehabilitation Plan) in vocational rehabilitation. In essence, however, all service providers are talking about the same thing, namely, individualized instructional plans for persons who are developmentally delayed such that they can progress toward living independently in community-based settings. The ecological inventory involves an interview with a parent, guardian, and/or "significant" other(s) to determine their impressions of the most important and relevant skills to be targeted for instruction. Such skills are then prioritized for instruction and a plan for the incorporation of such skill instruction into the educational plan is determined.

Choosing Appropriate Communication Modes

Prior to the initiation of instruction, it is often necessary to determine the most appropriate communication mode for an individual. Until recently, many persons who are severely developmentally delayed have been subjected to learning communication skills through the mode of communication which is familiar to the educator. In other words, many individuals have had vocal speech instruction in one program, sign language in another, and possibly communication board instruction in yet another. Given the need for coordinated, consistent instructional programming for such persons, there is no doubt that the parent/guardian and a team of special educational professionals must determine a "potentially" viable mode of communication for the individual.

Harris-Vanderheiden and Vanderheiden (1977) have identified appropriate considerations for making such decisions. Such considerations include:

1. Current communication modes;
2. Motivation to communicate;
3. Physical disabilities affecting input/output modes;
4. Audience;

5. Current and future educational/vocational needs; and
6. Amount and type of professional consultation needed to facilitate the success of the student.

Program decisions based on these considerations, however, should be supported by an interdisciplinary team model. Although many definitions of an interdisciplinary team model have been documented in the literature, one successful model can be identified with the provision of special educational services for individuals who are multi-handicapped in the public schools (Christie, Fox, Sousie, & Tucker, 1982). A major emphasis of this model has been for team specialists to train professionals at a local level such that they can provide the necessary on-site, on-going consultation and training to local educators/service providers. The team can be comprised of the following individuals;

1. Direct service providers;
2. Educators with specific expertise in teaching individuals who are severely developmentally delayed;
3. Student (when appropriate);
4. Parent and/or guardian;
5. Speech/language pathologist;
6. Communication specialist;
7. Family physician;
8. Medical specialist (e.g., neurologist, orthopedist, otolaryngologist, etc);
9. Physical therapist; and
10. Occupational therapist.

In order for this model to be effective, the direct service provider must be willing to receive training from team specialists, and the specialists must be willing to release some components of their traditional disciplinary roles to the direct service provider. Because of the blurring of traditional roles, this model is sometimes referred to as "transdisciplinary". Additionally, team program recommendations must be incorporated into a functional, daily life plan for the individual. As the direct service provider is primarily responsible for program planning, teaching, and evaluation of progress, it is ultimately up to this person to ensure that this occurs.

Program Planning

Although a plethora of curricula for teaching persons who are severely developmentally delayed are currently available, the communication skills curriculum for an individual should be a natural outcome of the results of an ecological analysis. The remaining step is for the educator to delineate the vocabulary and social skills which must be mastered in order for the individual to engage independently in each activity within each environment specified in the instructional plan. Figure 1 provides an example of the use of this type of curricular planning.

In order for such programs to be successful, all individuals who work with the student should be trained to insure appropriate implementation. One way in which this can be monitored by a program supervisor is for this person to provide regular reliability checks for his or her staff.

Another important component of the curricular planning process is the specific instructional plan which will be implemented in order for the student to learn the communication/social skills. Such a plan must be individualized to the specific communication mode and learning needs of the student. A suggested instructional plan should include the following:

1. Instructional objectives to include conditions, behavior, and criteria;
2. Specific instructions for teacher cues;
3. Specific instructions for consequating correct and incorrect responses;
4. Specific instructions for consequating behaviors which interfere with learning, and
5. A plan for the generalization of acquired skills. Figure 2 provides an example of such an instructional plan.

Teaching Strategies

Halle (1982) identifies three training strategies which have proven effective for teaching communication skills. The most challenging and ecologically-oriented approach is that of incidental teaching. This approach necessitates that educators and families structure the environment such that the student must self-initiate a response before gaining access to a desired item and/or event. A typical example of the use of such an approach is that of placing highly reinforcing items out of the reach of a student such that he or she must emit a response (e.g.,

"I want....") before receiving the item(s). Naturally, this approach assumes that the student has such a response in his or her repetoire.

I. *Environment*: *Movie Theater*

II. *Subenvironment*: *Concession Stand*

Activity 1: Move to concession stand

Skill Cluster: a. Locate concession stand
b. Approach counter or wait in line
c. Move ahead with line

Vocabulary/Phrases needed

-Where is the concession stand (candy counter)?
-Please/Thank you
-Excuse me

Social Skills needed

- Walking quietly (no vocalizations/verbalizations above a conversational level)
-Asking for assistance at an appropriate distance (one arms's length) and making eye contact
-Waiting in line quietly (as defined above)

Activity 2: Purchase Item

Skill Cluster: a. Scan available items
b. Request item
c. Pay cashier
d. Receive item
e. Take change (if appropriate)
f. Move away from stand

Vocabulary/Phrases needed

-May I have a _____?
-Please/Thank you
-Names of available items
-Yes/No
-How much is a _____?

Social Skills needed

-Requesting an item at a conversational voice level
-Being polite (using please, thank you, excuse me, when appropriate)
-Moving away from stand slowly (not bumping into others unnecessarily)

Figure 1

STUDENT _____ INSTRUCTOR _____ SKILL _____ LOCATION _____ INITIATION _____

INSTRUCTIONAL OBJECTIVE

Conditions	Behavior	Criteria
Given a concession stand at a movie theater and the desire for a displayed item	The student will: a. scan available items; b. request item; c. pay cashier; d. receive item; e. take change (when appropriate); and f. move away from stand.	Independently within three (3) minutes using an acceptable communication mode (verbal language at a conversational level, sign, or communication board) such that the vendor understands the student and the requested item is received on each occasion within three (3) months of program initiation.

Program set-up	Definition: correct response(s)	Consequences: correct response(s)	Definition: incorrect response(s)	Consequences: incorrect responses
E: Student-initiated; Student has a desire for an item at the concession stand provided he or she has been exposed to the stand on prior occasions.	Student will: a. scan available items b. request item c. pay cashier d. receive item e. take change (when appropriate) f. move away from stand	Phase 1: Teacher provides social praise for each step performed correctly. Phase 2: Teacher provides social praise for every 2 steps performed correctly consecutively. Phase 3: Teacher provides social praise on a variable schedule of reinforcement.	Student does not perform the step or does so incorrectly.	Utilize levels of intervention (LOI) training: 5 - independence 4 - verbal cues 3 - modelling/gestures 2 - partial assistance 1 - full assistance
			Definition: competing behaviors	**Consequences: competing behaviors**
			Student vocalizes at a decibel level higher than that of normal speech.	1. Student is verbally reminded of his or her behavior. Student is reoriented to the present environment. 2. If the behavior persists, the student is escorted out of the theater, returns home and loses the opportunity to see the movie.

S.P. Sousie

Figure 2

Should this not be the case, then a mand-model approach can be employed to teach the basic response.

The mand-model approach necessitates the use of teacher-initiated cues to elicit responses and provision of correction procedures for errors. This approach may be the most commonly used in "regular" public school education. A typical example is for the teacher to initiate an interaction with the student (e.g., teacher displays a picture, points to it and asks, "What is this?" Correct responses are reinforced and incorrect responses are usually consequated by error correction procedures. By its very nature, this approach allows the student to err and necessitates further cuing. This can be confusing for a person who has great difficulty learning; however, this approach has been suggested for teaching new responses.

Another effective approach to teaching new responses to individuals who can imitate and match-to-sample is that of time delay (William J. Keogh, personal communication, 1980). This is an errorless training procedure which results in a transfer of stimulus control from teacher-initiated cues to student initiation of the appropriate response. One example of the use of such an approach is teaching noun comprehension to a student who has the ability to match-to- sample. This procedure involves presenting two stimuli and requesting the student to identify one of such stimuli. Initially, the teacher immediately presents a sample of the item which corresponds to the correct response. Given that the student can match-to-sample, it is likely that he or she will respond by pointing to or touching the correct item. If this is not the case, physical prompting may be necessary. Once the student is reliably responding to the correct item, the teacher then systematically delays the presentation of the sample to the point where the student makes a response before the presentation of the sample. At that point, the teacher provides positive reinforcement for correct responses and employs appropriate correction procedures for incorrect responses.

A major drawback to traditional communication skills training is that skills have been taught frequently in isolated settings (e.g., therapy rooms, classrooms). These skills most likely will not transfer from these settings to the natural environment. The ecological approach, on the other hand, necessitates training within the context of natural settings. In this regard, Wulz, Myers, Klein, Hall, and Waldo (1982) have defined an unobtrusive training model which epitomizes the use of an ecological and incidental approach. This model stresses the importance of teaching functional, environment-specific responses in brief, incidentally oriented training sessions. The approach differs from the type of intensive training models which were designed for parents wherein they were asked to provide daily, data-based instruction for children who were

severely developmentally delayed. This type of training can take a great deal of time during which there may be other siblings in the family who are in need of attention. In addition, this model stresses the importance of including other family members in the training by increasing the total number of interactions between family members and the child, thus increasing training opportunities and teaching parents and siblings to recognize the communicative behavior of the child.

Summary

The primary purpose of this paper was to emphasize the importance of ecologically-based communication skill assessment, instruction, and individual progress evaluation for persons who are severely developmentally delayed. There is no doubt that such skills are fundamental to the assimilation of such persons into "normal" society.

Additionally, the content presented can provide a training model which can enable special educators to teach families and other direct service providers to teach communication skills to such persons. Given that these individuals can best utilize an incidental teaching approach which emphasizes training in natural environments, it is of the utmost importance that they receive such training.

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